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IS 3329 (1973): Socks, Cotton [TXD 10: Hosiery]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 3329 - 1973

Indian Standard
SPECIFICATION FOR
SOCKS, COTTON
(*First Revision*)

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NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR SOCKS, COTTON

(*First Revision*)

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Indian Standard
SPECIFICATION FOR
SOCKS, COTTON
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 August 1973, after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

0.2 This standard, originally published in 1965, is being revised with a view to incorporating the requirements of socks being procured by the Directorate General of Supplies & Disposals, Government of India, for the use by NCC Directorate. In view of the limited usage of cotton socks by the civilians, trade varieties, as incorporated in the original standard, have been deleted.

0.3 Considerable assistance has been derived in the preparation of this standard from IND/TC 0422 (b) 'Specification for socks, cotton, rib knit, khaki, issued by the Ministry of Defence, Government of India and G/Tex/G-160 'Socks, cotton, khaki and white for NCC Directorate', issued by the Directorate General of Supplies and Disposals, Government of India.

0.4 This standard contains clauses **4.2.3, 4.2.3.1, 5.3, 8.1** and **9.2** which call for agreement between the buyer and the seller.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the constructional details and other particulars of seamless cotton socks knitted in plain or rib stitches having rib top. The socks may be bleached or dyed.

*Rules for rounding off numerical values (*revised*).

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1.2 This standard does not prescribe the general appearance, shade, feel and lustre of the socks nor does it specify the degree of whiteness or shade (*see also* 5.3).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions as given in IS : 3596-1967* shall apply.

3. TYPES

3.1 The socks shall be of two types, namely, Type I and Type II.

NOTE — Socks of Type I are generally used by Armed Forces while socks of Type II are used by National Cadet Corps, Border Security Force and other organizations.

4. MANUFACTURE

4.1 **Yarn** — The cotton yarn used for knitting the socks, linking and splicing shall be evenly spun and uniformly twisted. The count of yarn used for knitting socks of Type I shall be 10 tex \times 2 (60s/2) and of Type II shall be 30 tex \times 2 (20s/2).

4.2 **Socks** — Socks shall generally be of the design as shown in Fig. 1.

4.2.1 Socks shall be knitted seamless on circular knitting machines. The heel and toe shall be knitted on either the front half or the back half of the machine. The pattern of socks shall be as follows:

Type I

Top	1 \times 1 rib
Leg (below top up to ankles and instep portion)	7 \times 1 rib
Foot (Sole)	Plain

Type II

Top	1 \times 1 rib
Leg and foot	Plain

4.2.2 **Linking** — The socks shall be securely linked over or under the toe either by hand stitching or by linking machine. In case of hand-linking, the linking yarn shall be 2-ply cotton yarn of strength not less than that of the yarn used in knitting the socks. In case of machine linking the cotton sewing thread of 10 tex \times 3 (60s/3) conforming to IS : 1720-1969† shall be used in the needle and cotton yarn of same count and quality as used for knitting in the looper. The shade of the linking yarn and sewing thread shall conform to that of knitting yarn.

*Glossary of terms relating to hosiery.

†Specification for cotton sewing thread (*first revision*).

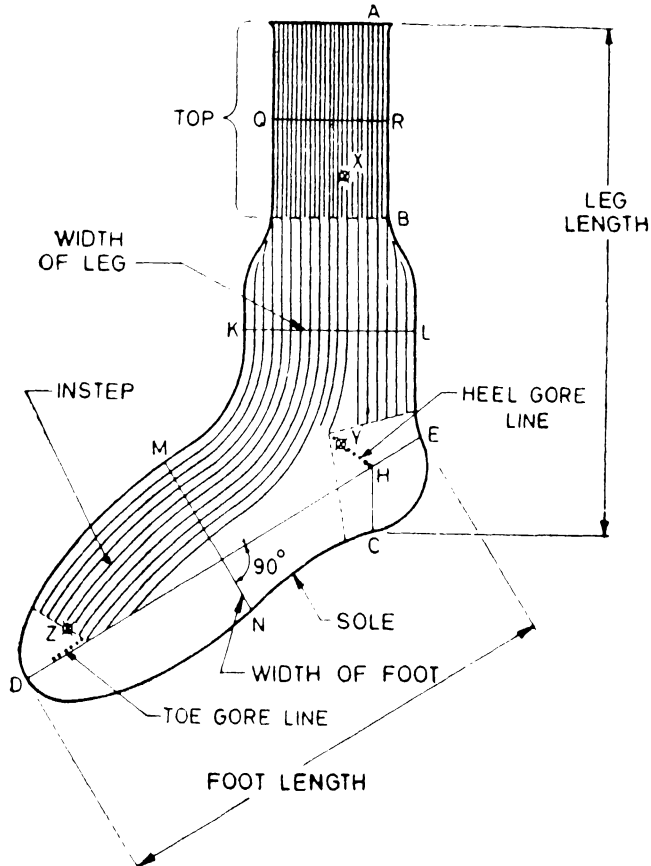


FIG. 1 'RIB TOP' COTTON SOCK

4.2.2.1 The length of free ends of linking yarn and other loose ends, if any shall be not less than 13 mm nor more than 25 mm. The linking shall not give way when the socks are stretched to the full extent of the elasticity of the knitted fabric without breaking. The linking shall be smooth and free from lumps and knots.

4.2.3 Splicing — The socks of Type I shall be spliced either at the heel and the toe portion or at the whole foot (including heel and toe) as required by the buyer. The socks of Type II are normally not spliced. If required by the buyer these socks shall be spliced at the heel and the toe portions. The heel may be high spliced, if so desired.

NOTE — The socks shall be held to be high spliced if splicing extends up to 5 cm above the heel.

4.2.3.1 The yarn used for splicing shall be cotton yarn 2 to 3 times finer than the yarn used for knitting. The shade of splicing yarn shall conform to that of knitting yarn except where it is specifically prescribed otherwise by the buyer.

4.3 Freedom from Defects — Socks should be free from manufacturing defects, such as largemends, ladders, dropped stitches, holes, improper splicing, chemical damages, etc. Dyed socks shall be free from dyeing defects, such as streakiness and uneven dyeing and white socks free from blueing agents. Socks shall be supplied in dry and clean condition and free from filling materials. They shall be correctly boarded to the size marked on them and pressed.

5. REQUIREMENTS

5.1 Dimensions and Weight — The socks of a particular size shall conform to the requirements of Table 1 or Table 2 as the case may be.

NOTE — Size of socks is denoted by a number which is the numerical value of foot length in centimetres.

Example :

A 25-size represents the socks having foot length of 25 cm.

5.2 Other Requirements — The socks shall conform to the other requirements as given in Table 3.

5.3 Sealed Sample — If, in order to illustrate or specify the general appearance, feel, lustre, degree of whiteness or shade, etc, a pair of socks has been agreed upon and sealed, the supply shall be in conformity with the sample in these respects.

5.3.1 The custody of sealed sample shall be a matter of prior agreement between the buyer and the seller.

6. PAIRING

6.1 Socks shall be matched and paired according to their type, size and shade. A tolerance of 1.25 cm in the leg length and 0.5 cm in the foot length of socks shall, however, be permissible while pairing.

7. MARKING

7.1 Each pair of socks shall be marked with the following:

- a) Size, and
- b) Initials or trade-mark of the manufacturer.

TABLE 1 CONSTRUCTIONAL DETAILS AND OTHER PARTICULARS OF COTTON SOCKS, TYPE I
(Clause 5.1)

SIZE	FOOT LENGTH (DISTANCE FROM D TO E THRO- UGH H)	LEG LENGTH (DISTANCE FROM A TO C THROUGH H)	WIDTH OF LEG AND FOOT (DISTANCE FROM K TO L OR M TO N)	DEPTH OF RIB TOP	TOTAL NUMBER OF WALES (NEEDLES)	NUMBER OF COURSES PER 5 cm	*MINIMUM WEIGHT PER 10 PAIRS	TYPE OF KNIT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	cm	cm	cm	cm			g	
23	23	28	9.0	11.5	136	48	425	Rib-Knit
24	24	29	9.0	11.5	136	48	425	
25	25	30	9.0	11.5	144	48	455	
26	26	31	9.5	12.0	144	48	455	
27	27	32	9.5	12.0	144	48	480	
28	28	33	9.5	12.0	144	48	510	
29	29	34	9.5	12.5	152	48	540	
30	30	35	10.0	12.5	152	48	570	
31	31	36	10.0	12.5	152	48	570	
TOLERANCE	+0.5 —0	+2 —1	±0.5	±0.5	—	±2	—	
METHOD OF TEST	A-3	A-3	A-3	A-3	A-4	A-4	A-5	—

*A minus tolerance of 3 percent in the weight shall be permissible for individual pair of socks provided the average minimum weight per 10 pairs is maintained as stipulated for the respective size.

TABLE 2 CONSTRUCTIONAL DETAILS AND OTHER PARTICULARS OF COTTON SOCKS, TYPE II
(Clause 5.1)

SIZE	FOOT LENGTH (DISTANCE FROM D TO E THRO- UGH H)	LEG LENGTH (DISTANCE FROM A TO C THROUGH H)	WIDTH OF LEG AND FOOT (DISTANCE FROM K TO L OR M TO N)	DEPTH OF RIB TOP	TOTAL NUMBER OF WALES (NEEDLES)	NUMBER OF COURSES PER 5 cm	*MINIMUM WEIGHT PER 10 PAIRS	TYPE OF KNIT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	cm	cm	cm	cm			g	
15	15	15	8.0	9.5	84	35	270	Plain-Knit
16	16	16	8.0	9.5	84	35	270	
17	17	17	8.0	9.5	84	35	300	
18	18	18	8.0	9.5	84	35	330	
19	19	19	8.0	9.5	84	35	330	
20	20	20	8.0	9.5	84	35	350	
21	21	21	9.0	9.5	96	35	365	
22	22	22	9.0	9.5	96	35	410	
23	23	23	9.0	10.0	96	35	425	
24	24	24	9.5	10.5	108	35	480	
25	25	25	9.5	10.5	108	35	540	
26	26	26	9.5	11.5	108	35	565	
27	27	27	9.5	11.5	108	35	595	
28	28	28	9.5	11.5	108	35	650	
29	29	29	9.5	12	108	35	710	
30	30	30	9.5	12	108	35	740	
31	31	31	9.5	12	108	35	765	
TOLERANCE	+0.5 -0	+2 -1	±0.5	±0	-	±2	-	-
METHOD OF TEST	A-3	A-3	A-3	A-3	A-3	A-4	A-5	-

*A minus tolerance of 3 percent in the weight shall be permissible for individual pair of socks provided the average minimum weight per 10 pairs is maintained as specified for the respective size.

TABLE 3 REQUIREMENTS OF SOCKS

(Clause 5.2)

SL No.	CHARACTERISTIC	REQUIREMENTS	METHOD OF TEST (REF TO INDIAN STANDARD OR CLAUSE OF APPENDIX A)
(1)	(2)	(3)	(4)
i)	Dimensional change (due to relaxation)	2.5 percent, <i>Max</i>	A-6
ii)	pH value of aqueous extract	Between 6 and 8.5	Cold Method of IS : 1390-1961*
iii)	Scouring loss, percent, <i>Max</i>	2.0	IS : 1383 - 1977†† (Mild method)
iv)	Colour fastness of dyed socks to:		
	a) Light	3 or better	IS : 2454-1967† or IS : 686-1957‡
	b) Washing	3 or better	IS : 687-1966§
	c) Perspiration	3 or better	IS : 971-1956¶
	d) Rubbing	3 or better	IS : 766-1956
v)	Residual chlorine	0.1 percent, <i>Max</i>	IS : 2350-1963**

*Methods for determination of pH value of aqueous extracts of textile materials.
†Method for determination of colour fastness of textile materials of artificial light (Xenon lamp).
‡Method for determination of colour fastness of textile materials to daylight.
§Method for determination of colour fastness of textile materials to washing: Test 1 (revised).
¶Method for determination of colour fastness of textile materials to perspiration.
|| Method for determination of colour fastness of textile materials to rubbing.
**Method for estimation of residual chlorine in cotton textile materials.

7.1.1 Socks may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

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8. PACKING

8.1 Socks shall be packed in accordance with IS : 3086-1965* or IS : 3325-1965† as the case may be

9. SAMPLING

9.0 The sampling procedure given below shall give desired protection to the buyer and the seller provided the lot submitted for inspection is homogenous. To achieve this the manufacturer shall maintain a system of process control at all stages of manufacture and shall ensure that the socks tendered by him for inspection comply with the requirements of this standard in all respects.

NOTE — For effective process control, the use of statistical quality control techniques is recommended and a helpful guidance may be obtained in this respect from IS : 397-1952‡.

9.1 Lot — In any consignment, all pairs of socks of the same type, colour and size shall be grouped together to constitute a lot.

9.1.1 The conformity of the lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from it.

9.2 Unless otherwise agreed to between the buyer and the seller, the number of pairs of socks, depending upon the size of the lot, shall be selected at random in accordance with col 2 of Table 4.

TABLE 4 NUMBER OF PAIRS OF SOCKS TO BE SELECTED FROM A LOT AND PERMISSIBLE NUMBER OF NON-CONFORMING PAIRS

(Clauses 9.2 and 9.3)

NUMBER OF PAIRS IN THE LOT	NON-DESTRUCTIVE TESTING		DESTRUCTIVE TESTING	
	Number of Pairs to be Selected	Permissible Number of Non-conform- ing Pairs	Number of Pairs to be Selected	Permissible Number of Non-conform- ing Socks
(1)	(2)	(3)	(4)	(5)
Up to 50	10	1	2	0
51 " 100	20	2	2	0
101 " 200	30	3	2	0
201 " 300	40	3	3	0
301 " 500	50	4	5	0
501 " 800	70	6	7	1
801 " 1 300	110	8	10	1
1 301 " 3 200	150	10	15	2
3 201 and above	220	14	30	3

*Code for seaworthy packaging of cotton hosiery yarn and goods.

†Code for inland packaging of cotton hosiery yarn and goods.

‡Method for statistical quality control during production by use of control chart (tentative).

9.3 The number of test samples and the criterion for conformity for various characteristics shall be as follows:

<i>Characteristic(s)</i>	<i>Number of Test Samples</i>	<i>Criteria for Conformity</i>
Dimensions, number of wales and courses and freedom from defects	All the pairs selected according to col 2 of Table 4	Non-conforming pairs not to exceed the corresponding number given in col 3 of Table 4
Weight	All the pairs selected according to col 2 of Table 4	Each observed value satisfies the relevant requirement
Dimensional change pH value, scouring loss, colour fastness to various agencies except light	One sock from each pair selected according to col 4 of Table 4	Non-conforming pairs not to exceed the corresponding number given in col 5 of Table 4
Colour fastness to light	One up to 500 pairs and two above that	Each observed value satisfies the specified requirements

APPENDIX A

(Tables 1, 2 and 3)

METHODS OF TESTS

A-1. CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

A-1.1 Conditioning — Prior to test, the test specimens shall preferably be conditioned to moisture equilibrium in a standard atmosphere at 65 ± 2 percent relative humidity and $27 \pm 2^\circ\text{C}$ temperature (see IS : 196-1966*).

A-1.1.1 When the test specimens have been left in such an atmosphere for 24 hours in such a way as to expose, as far as possible, all portions of the specimens to the atmosphere, they shall be deemed to have reached moisture equilibrium.

*Atmospheric conditions for testing (revised).

A-1.2 Atmospheric Conditions for Testing — The tests shall preferably be carried out in the standard atmospheric conditions (*see A-1.1*).

A-2. QUALITY OF REAGENTS

A-2.1 Unless specified otherwise pure chemicals shall be employed in test and distilled water (*see IS: 1070-1960**) shall be used where the use of water or distilled water as a reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the experimental results.

A-3. DIMENSIONS

A-3.1 Procedure — Take each sock from the test sample. Lay it flat on a horizontal surface. Remove all the creases and wrinkles without distorting it. Measure to nearest 5 mm, the dimensions given in Table 1 or Table 2, as the case may be.

A-4. WALES AND COURSES

A-4.1 Procedure — Take each sock from the test sample. Lay it flat on a horizontal surface. Remove all the creases and wrinkles without distorting it. With the help of a pick glass or magnifying glass, count the number of wales including any fraction on one side and similarly the number of wales including any fraction on the other side of the sock, and finally, add the two values so obtained. Count the number of courses per 5 cm on either the leg or foot portion of the sock.

NOTE — In case it is difficult to count the number of courses due to the design of the sock, the courses may be counted on the inside, turning the sock inside out.

A-5. WEIGHT

A-5.1 Drying Oven — Suitable for drying the specimens to constant mass at $105 \pm 3^{\circ}\text{C}$ temperature and equipped with a weighing balance arranged to weigh with an accuracy of 0.5 g while the specimen is suspended within the drying chamber; the holder of the specimen shall be of such type as to ensure free access of dry air to all portions of the specimen.

A-5.2 Procedure — Take 10 pairs of socks from the socks constituting test sample. Dry them to constant mass in the drying oven and determine the collective mass.

NOTE — Constant mass shall be deemed to have been reached if the difference between successive weighings at an interval of 20 minutes is less than 0.05 percent of the first of the two weighings.

*Specification for water, distilled quality (*revised*).

A-5.3 Determine the mass as given below:

$$W = G \left(1 + \frac{R}{100} \right)$$

where

W = mass, in g, of 10 pairs of socks;

G = oven-dry mass, in g, of the socks as determined in **A-5.2**; and

R = moisture regain value for cotton.

NOTE — If the correct moisture regain value is not available, it should be taken as 8.5 percent.

A-6. DIMENSIONAL CHANGE (DUE TO RELAXATION)

A-6.1 Apparatus

A-6.1.1 Watertight Tray — of a suitable size and atleast 100 mm deep.

A-6.1.2 Graduated Steel Rule

A-6.2 Marking of Test Specimens — As illustrated in Fig. 1, mark on each test specimen by means of indelible ink or fast dyed cotton sewing thread, a set of three points X , Y and Z , such that:

- a) all the three points are on the same wale,
- b) point X is on the top portion,
- c) point Y is on the heel gore line, and
- d) point Z is on the toe portion of the sock.

NOTE — The colour of the indelible ink or sewing thread should be contrasting with that of the sock so that it is easy to measure the lines.

A-6.3 Procedure

A-6.3.1 Take one of the socks constituting the test sample. Place the specimen on the glass plate, carefully remove all wrinkles and creases without distorting the specimen and place the other glass plate on the test specimen. Measure separately correct to the nearest millimetres the distance between X and Y and that between Y and Z .

A-6.3.2 Soak the test specimen, laying it flat under a head of 25 mm of water containing 0.5 percent suitable wetting agent at 30 to 35°C for two hours in the watertight tray. At the end of this period, without removing the test specimen, drain the water out of the tray and dry the specimen on the flat surface at room temperature. Condition it again in the standard atmosphere for 24 hours (see **A-1.1**) Measure separately, correct to the nearest millimetre, the distance between X and Y and that between Y and Z .

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A-6.4 Calculate separately, correct to one place of decimal, the percentage dimensional changes between the points X and Y and that between Y and Z by the formula given below:

$$S = \frac{100 \times (a - b)}{a}$$

where

s = dimensional change, percent;

a = distance between the two points X and Y or Y and Z ; and

b = distance between the same points after soaking.

A-6.5 Calculate the average dimensional change between the two sets of points, namely, X , Y and Y , Z .

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 61 31

Telegrams : Manaksanstha

Regional Offices:

		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 26
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	27 59 90
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